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*Clinical Research*

# Risk Factor Modification Behaviors of Practicing Vascular Surgeons

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**Background:** National smoking rates have declined; however, it remains the primary modifiable risk factor for nearly all vascular disease. While vascular surgeons have the availability to treat patients via medical or surgical/endovascular means, involvement in risk factor modification may be lacking. This study seeks to understand vascular surgeons' involvement in tobacco cessation and risk factor modification and to determine if practice variables had any effect on provision of these services to vascular surgery patients.

**Methods:** Anonymous electronic surveys examining tobacco cessation and risk factor modification were sent to the Vascular & Endovascular Surgery Society members ($n = 633$). Influence of time from training, practice type (dichotomized into academic and nonacademic vascular surgeons), hospital size, region, and workload was assessed, and data were analyzed by univariate contingency tables.

**Results:** A total of 149 (24%) surveys were completed. While the majority of respondents ask patient's smoking status (97%), assess willingness to quit (84%), and advise patients to quit (95%), only 34% prescribe medications to assist in cessation, 7% see patients in tobacco cessation follow-up, and 3% verify cessation with cotinine levels or carbon monoxide monitoring. Surgeons who prescribed medications for cessation are more likely to assess patient's willingness to quit, prescribe/advise nicotine replacement, or prescribe initial statin or other lipid-lowering medications. There was no difference in perceived education received during training in risk factor modification, but only 26% of respondents thought they were well trained. Comparing academic to private practice vascular surgeons, there was no difference in cessation techniques used; however, academic surgeons were less likely to perform endovascular procedures for claudication in patients who continued to smoke (29% vs. 46%, $P = 0.03$) and more likely to prescribe an initial antihyperlipid medication (65% vs. 39%, $P = 0.0018$).

**Conclusions:** Tobacco dependence remains a critical issue for vascular surgery patients; however, there is wide variation in cessation techniques used. The majority of vascular surgeons are not well versed in cessation techniques and risk factor modification, and thus, efforts should be made to provide this education in vascular surgery training programs.

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## INTRODUCTION

Smoking, hypertension, dyslipidemia, and diabetes are well-established risk factors for vascular disease and are often present in patients presenting to a vascular surgeon's office.[1] Among these, smoking is the most significant modifiable risk factor for nearly all arterial disease. Smokers are diagnosed with peripheral arterial disease 10 years prior to nonsmokers, and there is a direct relationship between smoking and the development of this disease as well as progression to more severe symptoms including critical limb ischemia.[2,3] In aneurysmal disease, nearly 90% of patients have a history of tobacco use with almost 50% being active smokers, and continued tobacco use results in an increased rate of aneurysm expansion as well as an increased aneurysm rupture rate.[4,5] Smoking impacts wound healing after surgery; patients who continue to smoke during operations have significantly higher rates of wound infection and dehiscence compared to those who are abstinent at the time of surgery or who have never smoked.[6]

Of those smokers who attempt to quit smoking on their own, 30% relapse within 72 hr and only 2–3% are abstinent at 1 year.[7] A physician's advice to patients to quit smoking increases overall abstinence rates; even brief counseling is shown to have a positive impact on cessation.[8,9] In a study from Orleans and Alper, more than 70% of patients who smoke report a desire to quit and physician interventions with either counseling alone or medications and nicotine replacement can increase lasting abstinence rates from 7% to 30%.[10] However, incorporation of patient counseling with nicotine replacement or medications shows greater benefit than either alone and interventions performed prior to surgery are effective in helping patients to quit smoking.[11]

Despite the significant data establishing risk factor modification for patients with vascular disease that includes smoking cessation as a central tenant of care, a large percentage of patients presenting to vascular surgery offices are not receiving appropriate therapy for their comorbidities or other risk factors including smoking cessation advice and therapy.[12] The onus, thus, may fall on the vascular surgeon to provide these services to their patients who are not receiving this care elsewhere. The aim of this study is to determine the extent that vascular surgeons routinely assist patients in smoking cessation and manage other secondary risk factors for vascular disease. We subsequently explored whether there is any difference among practice variables (including practice type dichotomized into academic and nonacademic practices) in the management and treatment of these secondary arterial risk factors.

**Table I.** Respondents' practice type

| Type of practice | Number | Percent of total |
|---|---|---|
| Academic | 80 | 54 |
| Nonacademic | 69 | 46 |
| Private practice | 34 | 22 |
| Hospital employed practice | 23 | 15 |
| Governmental/ military employee | 10 | 6 |
| Other | 2 | 1 |
| Total | 149 | 100 |

## METHODS

All members of the Vascular & Endovascular Surgery Society (VESS) were sent an email invitation to take an anonymous and voluntary electronic 29-item survey with questions detailing their current risk factor modification efforts as well as practice patterns via ''SurveyMonkey.'' A reminder email to complete the survey was sent out 1 week following the initial request, and data collection was completed after 3 weeks. The survey was based loosely after one developed by Basnyat et al.[13] that questioned members of the Vascular Surgical Society of Great Britain and Ireland about tobacco cessation behaviors provided to their patients in 2000. We expanded the survey to include more detailed description of tobacco cessation behaviors provided, risk factor modification behaviors, and expanded practice patterns.

### Statistical Analysis

All data analysis was performed using Microsoft Excel (Redmond, Washington, USA) and Graphpad (La Jolla, California, USA). Descriptive statistics exploring practitioners' demographic features, methods to assist patients in their smoking cessation attempts, and mode of follow-up routinely performed by respondents as well as personal smoking behaviors of respondent physicians were analyzed. Tobacco cessation and risk factor modification behavior were compared between surgeons based on type of practice (academic versus other), size of hospital and vascular group worked in, geographic location, average case load per week, mode of vascular training received (residency versus fellowship), age, and gender. Categorical data were analyzed using a contingency table with Fisher's exact test and two-tailed *P*-values. A paired *t*-test